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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/935,995

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Richard E. Smalley

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03/22/2005

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EXAMINER

LE. HOA T

ART UNIT

PAPER NUMBER

1773

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. <u>09/935,995</u>		Applicant(s) SMALLEY ET AL.	
	Examiner H. T. Le		Art Unit 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-65 is/are pending in the application.
- 4a) Of the above claim(s) 1-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 36-65 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>Mar. '02 & June '04</u> . | 6) <input type="checkbox"/> Other: ____. |

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DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-35, drawn to polymer-coated carbon nanotube, classified in class 428, subclass 407.
 - II. Claims 36-65, drawn to polymer-wrapped carbon nanotube aggregates, classified in class 428, subclass 408.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are unrelated because they are not disclosed as capable of use together and have different functions and effects. Group I claims require polymer coating on at least part of the surface of the single-wall carbon nanotubes ("SWNT") and thus the carbon nanotubes are individually coated; therefore, surface bonding (usually covalent) between the nanotubes and the polymer coating is present. On the other hand, group II claims require uncoated carbon nanotubes bundled together and wrapped in a polymer layer; therefore, except for the outermost carbon nanotubes, there is no surface bonding (other than the weak van der Waals) between the SWNTs and between the polymer coating and the SWNT. These differences result in structural, physical and chemical differences between the

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products of inventions I and II. Therefore, they are not disclosed as capable of use together and have different functions and effects

Double Patenting

3. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

4. Claims 36-38 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 44-46 of copending Application No. 09/935,994. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented. The only difference between the examined claims and the conflicting claims is the wordings in the preamble: composition of matter of the examined claims vs. fiber of the conflicting claims. However, the composition of matter of the examined claims is essentially a fiber, because aggregates of nanotubes would result in fibrous shape.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 36-38 and 65 are provisionally rejected under the judicially created doctrine of double patenting over claims 27, 28, 58, 59 and 65 of copending Application No. 09/935,994. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: aggregates of single wall carbon nanotubes ("SWNT") wrapped in a polymer. The properties are intrinsic characteristics of polymer-carbon nanotube composite.

7. Claims 39-41, 44-51, 53-59, 63 and 64 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 44-46, 51, 53, 55, 58, 59, 62, 63, 65 and 66 of copending Application No. 09/935,994.

Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Claims 39-41, 44, and 64: The polymers specified in these claims are encompassed by the broad polymer recited in the conflicting claims.

Claims 45-51, 53-59 and 63: These are product-by-process claims; therefore, only product limitations are considered for patentability; and as far as product limitations are concerned, the examined claims 45-51 are not patentably distinct from the conflicting claims 44-46, 58, 59, 63, 63, 65 and 66 because both sets of claims are directed to aggregates of SWNT wrapped in a polymer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claim 60 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 61. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

9. Claim 61 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear whether the second polymer coats the same aggregate or a aggregate different from the aggregate that is coated by the first polymer. If it's the former, then it's

unclear how two polymers can be wrapped on the same aggregate. Are they superposed each other?

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 36-59 and 63-65 are rejected under 35 U.S.C. 102(b) as being anticipated by Star et al (“Preparation and Properties of Polymer-Wrapped Single-Walled Carbon Nanotubes”.*

Claims 36-38 and 65: See p. 1721, right column, second paragraph and p. 1722, right column, second paragraph.

Claims 39, 40, 42-44: See p. 1721, right column, second paragraph, lines 8-13 where various polymers (detailed can be viewed from the article cited in end note 8) are reported including conjugated polymers PmPV and PMMA (from the report cited at end note 8) which are amphiphilic.

Claim 41: See p. 1721, right column, second paragraph, lines 1-5.

Claims 45-59, 63 and 64: See “experimental section”, p. 1724-25.

* Copy of this document has been provided by Applicants.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over conventional nanotube/polymer composites known in the art in view of Star et al ("Preparation and Properties of Polymer-Wrapped Single-Walled Carbon Nanotubes").

Claims 60-62 are recited to SWNTs coated in one polymer and dispersed in the other. Thus they essentially claim a product comprising polymer-coated or polymer-wrapped SWNTs in a polymer matrix. Carbon nanotubes, particularly SWNTs, have been used as reinforcing material in nanotube/polymer composites. See for example, the discussion at page 2079, left column of the document entitled "Polypropylene Fibers Reinforced with Carbon Nanotubes" by Kearns et al. However, these known composites comprise of uncoated SWNTs. Star et al teach polymer-wrapped SWNTs as discussed and show that such SWNTs are functionalized by the wrapping polymer while retaining the original electrical properties of the uncoated SWNTs (see Star, p. 1724, right column, second paragraph). Therefore, it would have been obvious for one having ordinary skill in the art to incorporate the polymer-wrapped SWNTs taught by Star in conventional nanotube/polymer composites in order to improve dispersion of the SWNTs, thanks to the functionalization of the SWNTs provided by the wrapping polymer, and thus facilitate


processing of the conventional composites. Crosslinking between the two polymers is an inherent or expected result in polymer composites. Further, it would have been obvious for one having ordinary in the art to select polymers in such a way that they are compatible to each other for inter-grafting (i.e. crosslinking).

14. References not relied upon are cited as art of interest.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 10:00 a.m. to 6:30 p.m., Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



H. T. Le
Primary Examiner
Art Unit 1773